ENVIRONMENTAL QUALITY

CHAPTER 50

SOLID WASTE MANAGEMENT

Sub-Chapter 7

Ground Water Monitoring

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Ground Water Monitoring

17.50.701 PURPOSE AND APPLICABILITY (1) The purpose of this subchapter is to provide uniform standards for ground water monitoring and corrective action at Class II disposal facilities and Class IV disposal units. For purposes of this rule, "Class II disposal facility" and "Class IV disposal unit" have the meaning expressed in ARM 17.50.504.

(2) Compliance with the requirements of this subchapter must be implemented according to the following schedule:

(a) all new Class II units must be in compliance with this subchapter and initial sampling must be completed before waste can be placed in the unit;

(b) existing Class II units and lateral expansions that serve a geographic area with a population of 5,000 or more persons must be in compliance with all requirements of this subchapter and have commenced ground water monitoring by October 9, 1993; and

(c) existing Class II disposal units and lateral expansions that serve a geographic area with a population of 4,999 persons or less, except those meeting the requirements of ARM 17.50.506(16), must comply with this subchapter according to the following schedule:

(i) existing Class II disposal units and lateral expansions less than 1 mile from a drinking water intake (surface or subsurface) must be in compliance and have commenced ground water monitoring by October 9, 1994;

(ii) existing Class II disposal units and lateral expansions greater than 1 mile but less than 2 miles from a drinking water intake (surface or subsurface) must be in compliance and have commenced ground water monitoring by October 9, 1995;

(iii) existing Class II disposal units and lateral expansions greater than 2 miles from a drinking water intake (surface or subsurface) must be in compliance and have commenced ground water monitoring by October 9, 1996.

(d) Owners and operators of all MSWLF units that serve a geographic area with a population of 4,999 persons or less and meet the conditions of ARM 17.50.506(16) must comply with the requirements of this subchapter according to the following schedule:

(i) all MSWLF units less than 2 miles from a drinking water intake (surface or subsurface) must be in compliance and have commenced ground water monitoring by October 9, 1995; and

(ii) all MSWLF units greater than 2 miles from a drinking water intake (surface or subsurface) must be in compliance and have commenced ground water monitoring by October 9, 1996.

(e) All Class IV units must be in compliance with this subchapter (except for the provisions of ARM 17.50.705), and operated in compliance with this subchapter, and initial sampling must be completed before waste can be placed in the unit. (History: 75-10-204, MCA; IMP, 75-10-204, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; AMD, 1993 MAR p. 2672, Eff. 11/11/93; TRANS, from DHES, 1995 MAR p. 2253; AMD, 1997 MAR p. 1031, Eff. 6/24/97.)

17.50.702 DEFINITIONS Unless the context requires otherwise, in this part the following definitions apply:

(1) "Abandoned well" means a well whose use has been permanently discontinued from service and properly plugged with low permeability material to prevent the borehole from acting as a conduit for contaminants to enter the subsurface and to prevent inter-aquifer flow. Well abandonment must be in accordance with ARM 36.21.670 through 36.21.673 and 36.21.810.

(2) "Active life" means the period of operation beginning with the initial receipt of solid waste and ending at completion of closure activities.

(3) "Active portion" means any solid waste disposal unit, trench, cell or area that is receiving solid waste or has not been closed in accordance with department rules. Also known as "active unit" or "existing unit".

(4) "Aquifer" means any geologic formation, group of formations, or part of a formation capable of yielding significant quantities of ground water to wells or springs.

(5) "Aquitard" means a geologic formation, group of formations, or part of a formation, exhibiting low permeability and having little or no intrinsic permeability, that is stratigraphically adjacent to 1 or more aquifers and through which virtually no water moves. The hydraulic conductivity within an aquitard is much lower than in adjacent aquifers and is not sufficient to allow the completion of water supply wells within it. An aquitard is also known as a "confining bed", "confining layer", or "confining unit".

(6) "Assessment monitoring" means the monitoring that is required whenever a preventive action level has been detected in the ground water for 1 or more of the constituents in Table 1 [ARM 17.50.708].

(7) "Bentonite seal" is an impervious layer of hydrated bentonite (i.e., sodium montmorillonite) (e.g., granular or powdered) placed between the well casing and the borehole wall, 1 to 2 feet above the filter/gravel pack adjacent to the screened interval for the purpose of sealing and restricting ground water movement to the particular aquifer/zone designated for monitoring in each well. The minimum sealing thickness must be 1½ inches around the outside of the casing on all sides,

except for driven wells in accordance with ARM 36.21.806(2).

(8) "Borehole" means an open or uncased subsurface hole created by drilling.

(9) "Casing pipe" means finished in sections with either threaded connections or beveled edges to be field welded, which is installed temporarily or permanently to counteract caving, to advance the borehole, or to provide structural protection to the well and restrict unauthorized access to the well.

(10) "Closed unit" means any solid waste disposal unit, trench, cell or area that no longer receives solid waste and has been closed in accordance with department rules.

(11) "Closure" means the process by which an owner or operator of a facility closes all or part of a facility in accordance with a department approved closure plan and all applicable closure requirements.

(12) "Confined aquifer" means an aquifer confined by an overlying stratigraphic unit that has a significantly lower hydraulic conductivity than the aquifer hosting the confined ground water. Pore water pressure at the top of the confined aquifer is greater than atmospheric pressure.

(13) "Contamination" means the degradation of natural, background water quality by an undesirable substance not normally present or an unusually high concentration of a naturally occurring substance. There is no indication of specific limits, since the degree of permissible contamination depends upon the intended use, or uses, of the water.

(14) "Detection limit" means the lowest concentration for an analytical test method and sample matrix at which the presence of a substance can be identified in an analytical sample, with a stated degree of confidence, regardless of whether the concentration of the substance in the sample can be quantified.

(15) "Detection monitoring" means the ground water monitoring required by this subchapter, including sampling procedures specified in ARM 17.50.708(4).

(16) "Drilling fluid" means a liquid or gas which may be used in the drilling operation to remove cuttings from the borehole, to clean and cool the bit, to reduce friction between the drill stem and the borehole wall, and to seal the borehole to prevent loss of drilling fluids.

(17) "Enforcement standard" means a numerical value expressing the concentration of a substance in ground water triggering assessment monitoring or corrective action, as specified in this subchapter.

(18) "Existing unit" means any solid waste disposal unit that is receiving solid waste as of October 9, 1993, and received it immediately prior to that date as well. Waste placement in existing units must be consistent with past operating practices or modified practices to ensure good management.

(19) "Facility" means all contiguous land and structures, other appurtenances, and improvements on the land (licensed or unlicensed) used for landfilling or otherwise disposing of municipal solid wastes or any licensed class II landfill.

(20) "Filter pack/gravel pack" means a clean silica sand or sand and gravel mixture that is installed in the annular space between the borehole wall and the well screen or developed in-situ, extending an appropriate distance above and below the screen or monitoring device/point, for the purpose of retaining and stabilizing the particles from the adjacent strata.

(21) "Ground water" means all water below the land surface.

(22) "Ground water class" means a ground water quality classification established in ARM 17.30.1002.

(23) "Ground water quality standards" means the standards for ground water quality set forth in ARM 17.30.1003.

(24) "Grout" means an impervious or low permeability material placed in the annulus between the well casing or the riser pipe and the borehole wall to maintain the alignment of the casing and to act as a seal to prevent movement of ground water or surface water within the annular space. It also includes the material placed in a borehole to plug the borehole during abandonment.

(25) "Grouting" means the operation by which grout material is placed in the borehole.

(26) "Hazardous substance" means a substance that because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent or substantial threat to public health, safety, or welfare or the environment or is a substance that is defined as a hazardous or deleterious substance in 75-10-701(6), MCA.

(27) "Hydraulic conductivity" means an indication of a formation's ability to transmit ground water (the more capable the formation, the higher the hydraulic conductivity). It is a function of the porous medium as well as the fluid, and is equal to the ratio of flow velocity to hydraulic gradient of a given formation. Strictly defined it is the product of the intrinsic permeability of the earth material, the density of the fluid, the acceleration due to gravity, and the inverse of the dynamic viscosity of the water.

(28) "Hydraulic gradient" means the total change in hydraulic head with distance in a given direction.

(29) "Land application unit" means an area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for agricultural purposes or for treatment and disposal.

(30) "Landfill" means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile.

(31) "Lateral expansion" means a horizontal expansion of the waste boundaries of an existing disposal unit.

(32) "Leachate" means a liquid that has contacted, passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from such waste.

(33) "Monitoring well" means a well that is used for ground water sample recovery, ground water quality monitoring, or ground water level measurement, but whose primary purpose is not withdrawal or injection of water. Monitoring well does not include water supply wells, geotechnical borings, pumping test wells, or corrective action or remedial action wells.

(34) "Municipal solid waste landfill unit (or MSWLF unit)" means a discrete area of land or an excavation that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile. A MSWLF unit also may receive other types of RCRA subtitle D wastes, such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste and industrial solid waste. Such a landfill may be publicly or privately owned. A MSWLF unit may be a new MSWLF unit, an existing MSWLF unit or a lateral expansion.

(35) "New unit" means any solid waste disposal unit that has not received waste prior to October 9, 1993.

(36) "No migration petition" means a request from an owner or operator of a facility for a variance from these ground water monitoring rules as provided for in 75-10-207(2), MCA.

(37) "Operator" means the person responsible for the overall operation of a facility.

(38) "Owner" means the person who owns a facility or part of a facility.

(39) "Permeability" means a measure of relative ease with which a porous medium can transmit a liquid under a potential energy gradient. It is a property of the medium that is dependent upon the shape, size, and degree of interconnection of the pores.

(40) "Practical quantitation limit" means the lowest concentration for an analytical test method and sample matrix at which the quantity of a particular substance can be measured with a stated degree of confidence.

(41) "Preventive action limit (PAL)" means a numerical value expressing the maximum allowable concentration of a substance in ground water, triggering assessment monitoring. The PAL is equal to the enforcement standard, or a statistically significant increase above background concentration, or a statistically significant decrease in pH.

(42) "Protective casing" means a section of pipe or tubing that is placed over the well casing at the surface to provide structural protection to the well and restrict unauthorized entrance into the well. A protective casing will usually extend a distance of several feet above and below land surface.

(43) "Qualified ground water scientist" is a scientist or engineer who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and has sufficient training and experience in ground water hydrology and related fields as may be demonstrated by state registration, professional certifications, or completion of accredited university programs that enable that individual to make sound professional judgments regarding ground water monitoring, contaminant fate and transport, and corrective action.

(44) "Soil boring" or "rock boring" or "boring" means a hole intended solely to determine the hydrogeological properties, composition, stability, density, movement, pressure, stratigraphy, or other physical properties of soil or rock.

(45) "Static water level" means the elevation above mean sea level or a local datum of the top of ground water as measured in a well casing.

(46) "Surface impoundment" means a facility or part of a facility that is a natural topographic depression, human-made excavation, or diked area formed primarily of earthen materials (although it may be lined with human-made materials), is designed to hold an accumulation of liquid wastes or wastes containing free liquids and is not an injection well. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons.

(47) "Transmissivity" means the rate at which water of prevailing kinematic viscosity is transmitted horizontally through a unit width of an aquifer under a unit hydraulic gradient. Strictly defined it is the product of the hydraulic conductivity and the thickness of the aquifer.

(48) "Unconfined aquifer" means an aquifer in which hydrostatic pressures at the water table are equal to atmospheric pressure. In unconfined aquifers, the water table is exposed to the atmosphere through pores in the overlying materials.

(49) "Unit" means a discrete area of land or an excavation used for the landfilling or other disposal of solid waste.

(50) "Uppermost aquifer" means the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary.

(51) "Water table" means the water surface elevation in an unconfined aquifer not influenced by capillary forces. The water table is strictly defined as the surface on which the water pressure in the pores of a porous medium is exactly atmospheric.

(52) "Well screen" means a pipe or cylindrical tubing with factory cut slots of a uniform width, orientation, and spacing designed and placed in the well so as to provide contact with all or a portion of the zone of saturation. For monitoring wells, well screen does not mean perforated or hand saw cut casing, or other well-site manufactured screen.

(53) "Zone of saturation" means a hydrologic zone in which all the interstices between particles of geologic material or all of the joints, fractures, or solution channels in a consolidated rock unit are filled with water under pressure greater than that of the atmosphere. (History: 75-10-204, MCA; IMP, 75-10-204, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

Rules 17.50.703 and 17.50.704 reserved

17.50.705 HYDROGEOLOGICAL AND SOILS STUDY (1) All facilities required to monitor ground water are required to prepare a site specific hydrogeological and soils report of the facility. Four copies of the report must be transmitted to the department. The report must contain sufficient data and plans to provide the department with a sound basis to determine the adequacy of the proposed ground water monitoring system. At a minimum, the scope of each report will include the following components:

(a) The owner or operator shall conduct a program to evaluate hydrogeologic conditions at the facility. This program shall provide the following information:

(i) A description of the regional and facility specific geologic and hydrogeologic characteristics affecting ground water flow beneath the facility, including:

(A) regional and facility specific stratigraphy;

(B) structural geology;

(C) depositional history;

(D) identification and characterization of areas and amounts of potential recharge and discharge;

(E) a discussion of regional deeper aquifers of significance;

(F) regional and facility specific ground water flow patterns;

(G) characterization of seasonal variations in the ground water flow regime;

(H) resource value of the uppermost aquifer; and

(I) identification and description of the confining layers present, both above and below the saturated zone(s).

(ii) An analysis of any topographic features that might influence the ground water flow system (springs, sinkholes, lineaments, outcrops, rivers, and other surface water or topographical features.

(iii) Based on field data, tests, and cores, preparation of a representative and accurate classification and description of the hydrogeologic units which overlie the uppermost aquifer or which may be part of the leachate migration pathways at the facility (including saturated and unsaturated units), including:

(A) hydraulic conductivity, effective porosity, and porosity (from slug testing, pumping tests or laboratory methods);

(B) lithology, grain size, sorting, degree of cementation;

(C) an interpretation of the relative degree of interconnections between saturated zones; and

(D) the leachate attenuation capacity and mechanisms of the natural earth materials.

(iv) Based on field studies and cores, structural geology and hydrogeological cross sections showing the extent (depth, thickness, lateral extent) of hydrogeological units which may be

part of the leachate migration pathways and identifying:

(A) laterally extensive and hydrogeologically significant sand and gravel layers in unconsolidated deposits.

(B) cross sections should include significant aquifers beneath the uppermost aquifer, particularly if the uppermost aquifer is thin or laterally discontinuous, as well as applicable confining layers;

(C) zones of fracturing or channeling in both horizontal and vertical directions in consolidated or unconsolidated deposits;

(D) zones of higher permeability or lower permeability that might direct and restrict the flow of contaminants;

(E) the uppermost aquifer; and

(F) water bearing zones above the first confining layer that may serve as a pathway for leachate migration including perched zones of saturation.

(v) Based on data obtained from ground water monitoring wells installed upgradient and downgradient from the waste disposal areas, a representative description of water level or fluid pressure monitoring will be prepared including:

(A) water level contour and/or potentiometric maps;

(B) hydrogeologic cross sections showing hydraulic gradients;

(C) the flow system including the vertical and horizontal components of flow; and

(D) any temporal changes in hydraulic gradients.

(vi) A description of manmade influences that may affect the hydrogeology of the site (schedules and volumes of production for local water supply wells, pipelines, drains, ditches, septic tanks, etc.).

(vii) The hydrogeological report shall include a description, construction facts, location, elevation, well log, sampling history and operational history of all existing wells for monitoring ground water quality and static water level elevation at the facility.

(viii) The quality of ground water monitored by the ground water monitoring well network will be analyzed and the results included with the hydrogeological report. At a minimum the parameters listed in Table 1 [ARM 17.50.708] are required for each existing monitoring well.

(ix) The report shall include and explain all calculations supporting ground water flow directions and velocities, determinations of hydraulic conductivity, transmissivity, porosity, permeability, and estimated leachate transport times.

(x) Characterization of the soil and rock units above the water table in the vicinity of the landfill, including, but not limited to, the following information:

(A) USCS soil classification;

(B) surface soil distribution;

(C) unsaturated zone hydraulic conductivity;
(D) porosity;
(E) soil organic content;
(F) soil pH;
(G) particle size distribution;
(H) moisture content, specific capacity, infiltration rate;
(I) soil stratification effect on unsaturated flow;
(J) mineral content; and
(K) soil boring information gathered in the following manner:

(I) all borings shall be within 300 feet of the limits of waste filling (if practical);

(II) borings shall extend a minimum of 20 feet below the base of waste disposal areas, or to bedrock, whichever is less;

(III) Sufficient soil borings must be done to define the soil and bedrock conditions. The initial drilling must include borings positioned throughout the site; within each geomorphic feature including ridges, knolls, depressions, and drainage swales; and within any geophysical anomalies already identified. The minimum required number of borings for this initial drilling is as follows:

0-10 acres	15 borings
11-20 acres	add 1 boring per additional acre
20-40 acres	add 1 boring per additional 2 acres
41 or more acres	add 1 boring per additional 4 acres

75% of the required number of boring may be conducted with a backhoe to a depth of 10 feet.

(IV) samples of all significant hydrostratigraphic units encountered during soil boring will be described in full in a report appendix;

(V) borings not converted to wells shall be abandoned in accordance with the well abandonment specifications herein; and

(VI) a boring log shall be submitted for each boring. Each boring log shall include soil and rock descriptions, methods of sampling, sample depths and elevations, date of boring, land surface elevation, bottom of boring elevation, moisture content, and consolidation test results such as blow counts, vane sheer or pocket penetrometer. If the boring is converted to a well, include the water level at time of drilling, dates of water level measurements and a well construction diagram.

(xi) An appendix shall be included which lists the references used and includes any additional data not previously presented, supplemental design calculations, material specifications, well construction specifications, and other appropriate information.

(b) The facility owner or operator or their consultant

must perform the hydrogeological and soils study in a professional and workmanlike manner. If the operator fails to provide the necessary hydrogeological and soils information required by the department, then the owner must do so. Additional studies may be required if the department determines that the studies will lead to increased protection of public health and natural resources. A report will not be considered complete until it is approved in writing by the department.

(c) The hydrogeological and soils report must be completed for new and existing facilities within the following time frames:

(i) applicants for new facilities must submit a complete report before the department will consider an application to be complete;

(ii) existing, operating facilities must submit a complete report within the following time frame:

(A) a work plan must be submitted 90 days after notification by the department;

(B) a revised work plan must be submitted 15 days after the department comments are received;

(C) the hydrogeologic and soils report must be submitted 180 days after the work plan is approved by the department; and

(iii) facilities which serve a geographic area with a population of 5,000 or more persons that accepted solid waste after October 1, 1989, and have ceased taking waste prior to October 9, 1993, must submit to the department a complete report. The report must be submitted no later than one year after the department requests the report. Closure will not be final until the department approves of the report.

(d) A work plan must be submitted to the department for approval at least 180 days in advance of any applicable deadline specified in ARM 17.50.701(2). (History: 75-10-204(5), MCA; IMP, 75-10-204, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.706 LOCATION AND NUMBER OF MONITORING WELLS

(1) The background ground water quality monitoring well(s) must be located so as to monitor the quality of ground water representative of the ground water passing the relevant point of compliance that has not been affected by leakage from the unit. At least 1 background water quality monitoring well is required at all facilities. At least 2 background wells must be installed at facilities where statistics will be utilized for ground water quality data evaluation unless it can be demonstrated to the department's satisfaction that a single well will suffice for the statistical test method chosen for ARM 17.50.708.

(a) A determination of background quality may include sampling of wells that are not hydraulically upgradient of the waste management area where:

(i) Hydrogeologic conditions do not allow the owner or operator to determine what wells are hydraulically upgradient; or

(ii) Sampling at other wells will provide an indication of background ground water quality that is as representative or more representative than that provided by the upgradient wells and will represent the quality of ground water passing the relevant point of compliance.

(2) Downgradient ground water quality monitoring wells must be capable of detecting a migration of hazardous constituents from active and closed waste disposal areas. The number and location of downgradient monitoring wells must be approved in writing by the department. At least 2 downgradient monitoring wells are required, although the department may require more.

(a) The downgradient monitoring system must be installed at the relevant point of compliance specified by the department that ensures detection of ground water contamination in the uppermost aquifer. When physical obstacles preclude installation of ground water monitoring wells at the relevant point of compliance at existing units, the down-gradient monitoring system may be installed at the closest practicable distance hydraulically down-gradient from the relevant point of compliance specified by the department.

(3) All wells shall be designed, installed, developed, sampled and documented in accordance with procedures outlined herein. (History: 75-10-204, MCA; IMP, 75-10-204, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.707 MONITORING WELL CONSTRUCTION (1) All ground water monitoring wells must be constructed by a licensed monitoring well constructor pursuant to 37-43-302, MCA, to the standards contained in ARM 36.21.801 through 36.21.808, and as required by this section, so as to obtain representative static water level data and ground water samples. An owner or operator may request from the department a waiver of the requirements listed in this rule for wells already constructed by the date of implementation of this rule. However, this waiver can only apply to wells previously approved by the department.

(2) Water samples may not be collected from piezometers unless constructed to specifications for standard monitoring wells.

(3) Drilling fluids and water may be used to drill monitoring wells only when there are no reasonable alternatives. If drilling fluids are used, the owner/operator shall document the type of fluids, any additives used and the chemical constituents of the mixture. If water is used, the source of water shall be identified.

(4) Drill rigs and all downhole equipment must be cleaned in accordance with technically accepted procedures prior to initiation of drilling on site. If site investigation is conducted at an existing landfill facility, then the rig and all downhole equipment must be decontaminated prior to the first borehole and between each borehole.

(5) When drilling equipment comes into contact with probable contaminants in the borehole or above ground, the driller shall thoroughly decontaminate the equipment prior to any additional drilling.

(6) A hydrogeologist, qualified ground water scientist, or other qualified person shall:

(a) observe and direct the drilling of all borings, the installation and development of all wells and all in-field hydraulic conductivity tests;

(b) demonstrate their competency in hydrogeology by submitting to the department a statement of qualifications before commencing work; and

(c) visually describe and classify all of the geologic samples derived from boring and well cuttings or samples.

(7) All monitoring wells must be constructed:

(a) to minimize the potential for contaminants to enter the ground water or to move from one major soil unit or bedrock formation to another;

(b) with a difference of 3 to 5 inches between the outer diameter of the casing/screen and the inner diameter of the surface of the borehole to facilitate placement of the filter pack, as well as annular sealants; and

(c) with grout or other seal material extended down to within 5 feet of the zone being monitored.

(8) All ground water monitoring wells shall have caps to

prevent contaminants from entering the monitoring device. All monitoring wells shall have protective outer casings and locking lids. The lids shall be kept locked. The department may require additional protective devices such as rings of brightly colored posts around any monitoring device.

(9) All monitoring wells shall be clearly and permanently labeled and water level measuring points clearly marked. At a minimum, the label shall include the well name and number.

(10) All ground water monitoring wells must be properly developed to remove fine soil particles, drill cuttings and drilling fluids from the vicinity of the well screen. After development the ground water must be tested for pH, temperature, specific conductance and total suspended solids. If liquid drilling fluids were used during well construction, a sample must also be tested for chemical oxygen demand. After development, all wells must be repeatedly measured for static water level until stabilized measurements are obtained.

(11) Ground water monitoring well information must be reported on department approved forms. The department will provide forms for reporting ground water monitoring well construction, boring log information, well development, and other ground water monitoring information as required by the department, including:

(a) the type, diameter, length and elevation of the top of the protective casing;

(b) the grout used as a surface seal between the well casing and the protective casing, including the depth and width of surface seal below the land surface, the height and width of the plug above the land surface;

(c) the type of cap and lock mechanism;

(d) the well casing material, length, diameter, schedule, and type of joints;

(e) the screen material, length, diameter, schedule, slot type and size, percent open area, and type of screen bottom;

(f) the distance the filter pack extends above the screen;

(g) the thickness of the filter/gravel pack (i.e. the spacing differential between the outer diameter of the casing/screen and the inner diameter of the surface of the borehole);

(h) local datum or mean sea level elevations of the top of casing and land surface to plus or minus 0.05 feet, depth from the land surface to an elevation of the bottom of the borehole, the bottom of the well screen, and top and bottom of all seals; and horizontal well locations identified by the landfill coordinate system to the nearest ten feet;

(i) the filter pack material, including grain size analysis, quantity of packing material used and manufacturer and product name or number;

(j) the drilling fluid including additives or water added during drilling;

(k) the drilling method used, type of drill rig, borehole diameter, inside diameter of the hollow stem auger, if used, cleaning procedures, and the date the well was drilled; and

(l) the date the well was developed, development method, time spent developing the well, volume of water removed and added during development, source of development water, the clarity of water before and after development, presence of sediment at the bottom of the well before and after development, and volume of water purged.

(12) Requirements for drilling are as follows:

(a) In order to create a stable, open, vertical well hole for installation of the well screen and riser, one of the following drilling methods must be utilized, listed in decreasing order of preference:

(i) Drilling with hollow stem augers is the most preferred method.

(ii) Air rotary drilling with an oil filter/trap.

(iii) Cable tool methods and other percussion tool drilling may be attempted in hard, consolidated formations.

(iv) Reverse circulation drilling is preferred to wet rotary drilling.

(v) Wet rotary drilling with clean water only and insertion of temporary flush-joint casing, with consideration being given to the procedures used to prevent mixing of upper zones with lower zones.

(b) Continuous soil sampling or sampling collection at five foot intervals and lithologic changes should be performed.

(c) All materials used in construction must be free of chemicals, paint, coatings, etc., that could leach. Decontamination of all downhole assemblies must be performed, using steam or an appropriate alternative.

(d) When assembling a well screen, riser, and sampler, there must be a stable borehole. The order of steps to complete the well must be:

(i) assembly of well screen and riser;

(ii) setting the well screen;

(iii) placement of the filter/gravel pack;

(iv) placement of the seal;

(v) grouting of the annular space;

(vi) well protector;

(vii) installation of the [dedicated] sampler.

(e) Well development must be continued until representative formation water, free of the effects of well construction, is obtained and the specific conductance, temperature, and pH have stabilized.

(13) The department hereby adopts and incorporates by reference ARM 36.21.801 through 36.21.808, which contain standards for construction of water wells. Copies of ARM 36.21.801 through 36.21.808 are available from the Department of Environmental Quality, PO Box 200901, Helena, MT 59620-0901

[(406)444-1430]. (History: 75-10-204, MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.708 SAMPLING AND ANALYSIS PLAN (1) The owner or operator or their consultant shall prepare or have prepared a sampling and analysis plan (SAP) for use during all ground water sampling activities in and around the facility. The SAP shall include:

(a) a sampling plan including:

(i) objectives;

(ii) schedules and task assignments;

(iii) access (if off-site sampling is done);

(iv) sampling procedures, including:

(A) sample acquisition methods;

(B) locations and ID numbers (map);

(C) the order of sample collections:

(I) by well location or sampling point number; and

(II) according to required analytical parameter/chemical constituent analyses;

(D) sampling objectives:

(I) normal monitoring samples; and

(II) samples to determine the nature and extent of contamination;

(E) quality assurance/quality control (QA/QC) samples;

(F) shipping and handling arrangements;

(G) notification procedures to allow the department the opportunity to obtain split sampling; and

(H) analytical parameters, including:

(I) Table 1 parameters;

(II) laboratory and analytical methods, according to approved US EPA method numbers, including practical quantitation limits and detection limits;

(III) sample containers preservation and holding times; and

(IV) laboratory-generated QA/QC samples.

(v) list of supplies and equipment; and

(b) a QA/QC plan, including:

(i) field QA/QC methods:

(A) standard operating procedure for field sampling methods;

(B) field documentation methods;

(C) frequency of QA/QC samples:

(I) duplicates; and

(II) blanks.

(D) field instrument calibration;

(E) chain of custody procedures;

(ii) laboratory quality assurance/quality control (QA/QC) program:

(A) laboratory identification;

(B) sample custody;

(C) analytical turn-around time;

(D) calibration procedures and frequency;

(E) data reduction, validation, and reporting;

(F) internal quality control checks;
(G) performance system and audits; and
(H) specific procedures for routine assessment of data precision, accuracy and completeness.
(c) if sampling contaminated ground water, a health and safety plan, including:
(i) level of protection;
(ii) hazard evaluation;
(iii) ground water characteristics;
(iv) special site considerations;
(v) emergency information;
(vi) decontamination procedures, including:
(A) disposal of water from sampling effort; and
(B) equipment and personnel decontamination.
(2) The SAP must be submitted to the department prior to any ground water sampling and shall be implemented as modified and approved in writing by the department.
(3) Requests for revisions to the SAP will be submitted to the department by the owner or operator of a facility. The department may approve, deny or modify revisions to the SAP.
(4)(a) Once established at a disposal unit, ground water monitoring must be conducted throughout the active life and post-closure care period of that disposal unit as specified in ARM 17.50.531. The minimum ground water sampling frequency must be twice per year, at least 3 months apart, at high and low ground water periods, unless otherwise specified in writing by the department. The high and low water ground water level periods will be determined through first year monthly water level measurements. The direction of ground water flow must be determined each time ground water elevations are measured. The rate of ground water flow must be determined each time a well is sampled.
(b) The department may specify an appropriate alternative frequency for repeated sampling and analysis during detection monitoring for Table 1 constituents, or the alternative list approved in accordance with (8) of this rule, during the active life (including closure) and the post-closure care period. The alternative frequency during the active life (including closure) must be no less than annual. The alternative frequency shall be based on consideration of the following factors:
(i) lithology of the aquifer and unsaturated zone;
(ii) hydraulic conductivity of the aquifer and unsaturated zone;
(iii) ground water flow rates;
(iv) minimum distance between the upgradient edge of the MSWLF unit and the downgradient monitoring well screen (minimum distance of travel); and
(v) resource value of the aquifer.
(5) Static water level elevation must be measured and

recorded to the nearest 0.05 foot in each ground water monitoring well immediately prior to sampling. The elevations must be reported in feet above mean sea level or local datum. The measuring point must be the top of the well casing and identified on the well itself if the top of the casing is not level. Water elevations in all wells must be measured in a sufficiently short time so as to avoid temporal variation.

(6) A copy of the approved sampling plan shall be kept at the facility or at the office of the facility owner and a field copy shall be provided to the sampling personnel for use during sampling. The sampling plan shall be followed unless a modification to the plan is approved in writing by the department.

(7) The following field parameters will be measured following well purging during each ground water monitoring event:

(a) pH;

(b) specific conductivity;

(c) static water elevation prior to purging; and

(d) temperature.

(8)(a) Unless otherwise specified in writing by the department the parameters listed herein as Table 1 must be monitored in the detection monitoring program.

(b) The department may delete any of the Table 1 constituents required under detection monitoring if it can be demonstrated that the removed constituents are not reasonably expected to be in or derived from the waste contained in the unit.

(c) The department may establish an alternative list of inorganic indicator parameters for a Class II unit, in lieu of some or all of the inorganic constituents listed in Table 1 (items 1-24), or some or all of the Table 1 constituents at Class IV units, if the alternative parameters provide a reliable indication of releases from the unit to the ground water. In determining alternative parameters, the department shall consider the following factors:

(i) the types, quantities, and concentrations of constituents in waste managed at the unit;

(ii) the mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone beneath the unit;

(iii) the detectability of indicator parameters, waste constituents, and reaction products in the ground water; and

(iv) the concentration or values and coefficients of variation of monitoring parameters or constituents in the ground water background.

(9) Analysis of the parameters listed in Table 1 must be conducted by an analytical laboratory that will follow the analytical methods referenced in EPA's "Methods for Chemical

Analysis of Water and Wastes" EPA-600, and "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," (SW-846) third edition, September, 1986, unless alternative methods are approved in advance by the department in writing. The metals parameters required for laboratory analysis must be for the dissolved metals concentration in the ground water, unless another alternative for analysis is approved in writing by the department on an individual facility basis. Practical quantitation limits (PQL) and detection limits for all chemical analyses must be in accordance with SW-846 and the EPA 600 series and must be listed with the results of analyses of each sample.

(10) The owner/operator must establish background ground water quality in a hydraulically upgradient or background well(s) for each of the monitoring parameters and constituents required according to Table 1 of this rule if detection monitoring is required or Table 2 of this rule if assessment monitoring is required. Background ground water quality may be established at wells that are not located hydraulically upgradient from the disposal unit if any of the following conditions exist:

(a) hydrogeologic conditions do not allow the owner/operator to determine what wells are hydraulically upgradient;

(b) physical obstacles preclude installation of an upgradient background monitoring well location; or

(c) sampling at other well will provide an indication of background quality that is representative or more representative than that provided by the upgradient wells.

(11) The number of samples collected to establish ground water quality data must be consistent with the appropriate statistical procedures determined in (12) of this rule. Sampling procedures will be those specified in (1)(a)(iv) of this rule.

(12) The owner or operator must use 1 of the following statistical methods in evaluating ground water monitoring data for each hazardous constituent, use the method chosen separately for each hazardous constituent in each well, and specify in the operating record and to the department which method will be used:

(a) A parametric analysis of variance (ANOVA) followed by multiple comparisons procedures to identify statistically significant evidence of contamination, including estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

(b) An analysis of variance (ANOVA) based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination, including estimation and testing of the contrasts between each compliance

well's median and the background median levels for each constituent.

(c) A tolerance or prediction interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.

(d) A control chart approach that gives control limits for each constituent.

(e) Another statistical test method that meets the performance standards of (13) of this rule. The owner or operator must place a justification for this alternative in the operating record and notify the department of the use of this alternative test. The justification must demonstrate that the alternative method meets the performance standards of (13) of this rule.

(13) Any statistical method chosen under (12) of this rule shall comply with the following performance standards, as appropriate:

(a) The statistical method used to evaluate ground water monitoring data must be appropriate for the distribution of chemical parameters or hazardous constituents. If the distribution of the chemical parameters or hazardous constituents is shown by the owner or operator to be inappropriate for a normal theory test, then the data must be transformed or a distribution-free theory test must be used. If the distributions for the constituents differ, more than one statistical method may be needed.

(b) If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a ground water protection standard, the test must be done at a Type I error level no less than 0.01 for each testing period. If a multiple comparisons procedure is used, the Type I experiment wise error rate for each testing period must be no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts.

(c) If a control chart approach is used to evaluate ground water monitoring data, the specific type of control chart and its associated parameter values must be protective of human health and the environment. The parameters must be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

(d) If a tolerance interval or a predictional interval is used to evaluate ground water monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the

population that the interval must contain, must be protective of human health and the environment. These parameters must be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

(e) The statistical method shall account for data below the limit of detection with 1 or more statistical procedures that are protective of human health and the environment. Any practical quantitation limit (PQL) that is used in the statistical method must be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.

(f) If necessary, the statistical method shall include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

(14) The owner or operator must determine whether or not there is a statistically significant increase over background values for each parameter or constituent required in the particular approved ground water monitoring program that applies to the disposal unit.

(a) In determining whether a statistically significant increase has occurred, the owner or operator must compare the ground water quality of each parameter or constituent at each monitoring well designated pursuant to ARM 17.50.706(2) to the background value of that constituent, according to the statistical procedures and performance standards specified under (12) and (13) of this rule.

(b) Within 15 days after completing sampling and analysis, the owner or operator must determine whether there has been a statistically significant increase over background at each monitoring well.

(15) Field records of all monitoring activities must be prepared in sufficient detail to document whether the ground water sampling plan has been followed. The facility owner or operator shall retain all field sampling records in the operating record for the active life and post-closure care periods of all Class II disposal units at the facility. The field records must be available for department and public inspection on request. The owner or operator shall submit sampling results and water elevation data within 90 days after sampling. A report describing any deviations from the approved sampling plan or analytical procedures must be submitted at the same time and placed in the operating record.

(16)(a) The department hereby adopts and incorporates by reference:

(i) EPA's "Methods for Chemical Analysis of Water and Wastes", (EPA-600); and

(ii) EPA's "Test Methods for Evaluating Solid Waste,

Physical/Chemical Methods", (SW-846), third edition, September, 1986.

(b) Both of the above documents prescribe standards for testing water for certain parameters. Copies may be obtained from the Department of Environmental Quality, PO Box 200901, Helena, MT 59620-0901 [(406)444-1430].

(see next page for table)

TABLE 1 - GROUND WATER MONITORING PARAMETERS

1. Antimony
2. Arsenic
3. Barium
4. Beryllium
5. Cadmium
6. Chloride
7. Chromium
8. Cobalt
9. Copper
10. Cyanide
11. Iron
12. Lead
13. Mercury
14. Nitrate (as N)
15. Nickel
16. Selenium
17. Silver
18. Sulfate (SO_4)
19. Thallium
20. Vanadium
21. Zinc
22. Chemical Oxygen Demand (COD)
23. pH
24. Specific conductance

25. The following volatile organic compounds (VOCs by EPA method 8260):

- Acetone
- Acrylonitrile
- Benzene
- Bromochloromethane
- Bromodichloromethane
- Bromoform
- Carbon disulfide
- Carbon tetrachloride
- Chlorobenzene
- Chloroethane
- Chloroform
- Chlorodibromomethane
- 1,2-Dibromo-3-chloropropane (DBCP)
- 1,2-Dibromoethane; (EDB)
- o-Dichlorobenzene; 1,2-Di-chlorobenzene
- p-Dichlorobenzene; 1,4-Di-chlorobenzene
- trans-1,4-Dichloro-2-butene
- 1,1-Dichloroethane
- 1,2-Dichloroethane
- 1,1-Dichloroethylene
- cis-1,2-Dichloroethylene
- trans-1,2-Dichloroethylene
- 1,2-Dichloropropane
- cis-1,3-Dichloropropene
- trans-1,3-Dichloro-propene
- Ethylbenzene
- 2-Hexanone; Methyl butyl ketone
- Methyl bromide; Bromometh-ane
- Methyl chloride; Chloro-methane
- Methylene bromide; Dibro-momethane
- Methylene chloride
- Methyl ethyl ketone; MEK
- Methyl iodide; Iodomethane
- 4-Methyl-2-pentanone; Meth-yl isobutyl ketone
- Styrene
- 1,1,1,2-Tetrachloroethane
- 1,1,2,2-Tetrachloroethane
- Tetrachloroethylene
- Toluene
- 1,1,1-Trichloroethane
- 1,1,2-Trichloroethane
- Trichloroethene
- Trichlorofluoromethane
- 1,2,3-Trichloropropane
- Vinyl acetate
- Vinyl chloride
- Xylenes

TABLE 2 - LIST OF HAZARDOUS INORGANIC AND ORGANIC CONSTITUENTS[1]

Common Name[2]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested PQL (µg/L)[6]	Methods[5]
Acenaphthene	83-32-9	Acenaphthylene, 1,2-dihydro-	10	8100 8270
Acenaphthylene	208-96-8	Acenaphthylene	10	8100 8270
Acetone	67-64-1	2-Propanone	100	8260
Acetonitrile; Methyl cyanide	75-05-8	Acetonitrile	100	8015
Acetophenone	98-86-2	Ethanone, 1-phenyl-	10	8270
2-Acetylaminofluorene; 2-AAF	53-96-3	Acetamide, N-9H-fluoren-2-yl-	20	8270
Acrolein	107-02-8	2-Propenal	5	8030
Acrylonitrile	107-13-1	2-Propenenitrile	100 200	8260 8260
Aldrin	309-00-2	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1α,4α,4aβ,5α,8α,8aβ)-	0.05 10	8080 8270
Allyl chloride	107-05-1	1-Propene, 3-chloro-	5	8010
4-Aminobiphenyl	92-67-1	[1,1'-Biphenyl]-4-amine	10 20	8260 8270
Anthracene	120-12-7	Anthracene	10 200	8270 8100
Antimony	(Total)Antimony		2000 30	7040 7041 6010
Arsenic	(Total)Arsenic		10 20 500	7060 7061 6010
Barium	(Total)Barium		1000 20	7080 6010
Benzene	71-43-2	Benzene	0.1 5 2	8021 8260 8020
Benzo[a]anthracene; Benzanthracene	56-55-3	Benz[a]anthracene	10 200	8270 8100
Benzo[b]fluoranthene	205-99-2	Benz[e]acephenanthrylene	10 200	8270 8100
Benzo[k]fluoranthene	207-08-9	Benzo[k]fluoranthene		

.....	8100	200	
			8270 10
Benzo[ghi]perylene	191-24-2	Benzo[ghi]perylene	
.....	8100	200	
			8270 10
Benzo[a]pyrene	50-32-8	Benzo[a]pyrene	
.....	8100	200	
			8270 10
Benzyl alcohol	100-51-6	Benzenemethanol	
.....	8270	20	
Beryllium	(Total)Beryllium		
6010 3			
			7090 50
			7091 2
alpha-BHC	319-84-6	Cyclohexane, 1,2,3,4,5,6-hexachloro-,	
..... 8080	0.05		
	(1α,2α,3β,4α,5β,6β)-		8270
10			
beta-BHC	319-85-7	Cyclohexane, 1,2,3,4,5,6-hexachloro-,	
..... 8080	0.05		
	(1α,2β,3α,4β,5α,6β)-		8270
20			
delta-BHC	319-86-8	Cyclohexane, 1,2,3,4,5,6-hexachloro-,	
..... 8080	0.1		
	(1α,2α,3α,4β,5α,6β)-		8270
20			
gamma-BHC; Lindane	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-,	
..... 8080	0.05		
	(1α,2α,3β,4α,5α,6β)-		8270
20			
Bis(2-chloroethoxy)-			
methane	111-91-1	Ethane, 1,1'-[methylenebis(oxy)]bis[2-	
chloro- ... 8110	5		
			8270 10

Common Name[2] (µg/L)[6]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL
Bis(2-chloroethyl)				
ether;	111-44-4	Ethane, 1,1'-oxybis[2-chloro-		
..... 8110	3			
Dichloroethyl ether			8270	10
Bis(2-chloro-1-				
methylethyl) ether; ...	108-60-1	Propane, 2,2'-oxybis[1-chloro-		
..... 8110	10			
2,2'-Dichlorodiisopropyl ether;			8270	10
DCIP, See note 7				
Bis(2-ethylhexyl)	1,2-Benzenedicarboxylic acid,			
phthalate	117-81-7	bis(2-ethylhexyl) ester		
.....	8060	20		
Bromochloromethane;	74-97-5	Methane, bromochloro-		
.....	8021	0.1		
Chlorobromomethane			8260	5
Bromodichloromethane; ..	75-27-4	Methane, bromodichloro-		
.....	8010	1		
Dibromochloromethane			8021	
0.2				
			8260	5
Bromoform; Tribromo-	Methane, tribromo-		8010	
2				
methane	75-25-2		8021	
15				
			8260	5

4-Bromophenyl phenyl ether	25	Benzene, 1-bromo-4-phenoxy-		8110	10
		101-55-3		8270	10
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester.	8060	5	10
			8270		
Cadmium	6010	(Total)Cadmium	7130	50	40
			7131	1	
Carbon disulfide		75-15-0 Carbon disulfide	8260	100	
Carbon tetrachloride		56-23-5 Methane, tetrachloro-	8010	1	
			8021	0.1	
			8260	10	
Chlordane		See Note 8 4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-	8080		0.1
		2,3,3a,4,7,7a-hexahydro-	8270	50	
p-Chloroaniline		106-47-8 Benzenamine, 4-chloro-	8270	20	
Chlorobenzene		108-90-7 Benzene, chloro-	8010	2	
			8020	2	
			8021	0.1	
			8260	5	
Chlorobenzilate		510-15-6 Benzeneacetic acid, 4-chloro-α-(4-chlorophenyl)-α-hydroxy-, ethyl ester	8270	10	
p-Chloro-m-cresol; 4-Chloro-3-methylphenol		59-50-7 Phenol, 4-chloro-3-methyl-	8040	5	20
			8270		
Chloroethane; Ethyl chloride		Ethane, chloro-	8010		5
		75-00-3	8021		1
			8260	10	
Chloroform; Trichloro-methane		Methane, trichloro-	8010	0.5	
		67-66-3	8021		0.2
			8260	5	
2-Chloronaphthalene		91-58-7 Naphthalene, 2-chloro-	8120	10	
			8270	10	
2-Chlorophenol		95-57-8 Phenol, 2-chloro-	8040	5	
			8270	10	
4-Chlorophenyl phenyl ether		Benzene, 1-chloro-4-phenoxy-	8110		40
		7005-72-3	8270		10
Chloroprene		126-99-8 1,3-Butadiene, 2-chloro-	8010	50	
			8260	20	
Chromium	6010	(Total)Chromium	7190	500	70
			7191	10	
Chrysene		218-01-9 Chrysene	8100	200	
			8270	10	
Cobalt	6010	(Total)Cobalt	7200	500	70
			7201	10	

Common Name[2]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested PQL (µg/L)[6]	Methods[5]
Copper	(Total)	Copper	6010	60
			7210	200
			7211	10
m-Cresol; 3-methylphenol	108-39-4	Phenol, 3-methyl-	8270	10
o-Cresol; 2-methylphenol	95-48-7	Phenol, 2-methyl-	8270	10
p-Cresol; 4-methylphenol	106-44-5	Phenol, 4-methyl-	8270	10
Cyanide	57-12-5	Cyanide	9010	200
2,4-D; 2,4-Dichlorophenoxyacetic acid	94-75-7	Acetic acid, (2,4-dichlorophenoxy)-	8150	10
4,4'-DDD	72-54-8	Benzene 1,1'-(2,2-dichloroethylidene)bis[4-chloro-	8080	0.1
			8270	10
4,4'-DDE	72-55-9	Benzene, 1,1'-(dichloroethenylidene)bis[4-chloro-	8080	0.05
			8270	10
4,4'-DDT	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	8080	0.1
			8270	10
Diallate	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	8270	10
Dibenz[a,h]anthracene	53-70-3	Dibenz[a,h]anthracene	8100	200
			8270	10
Dibenzofuran	132-64-9	Dibenzofuran	8270	10
Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-	8010	1
			8021	0.3
			8260	5
1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibromo-3-chloro-	8011	0.1
			8021	30
			8260	25
1,2-Dibromoethane; Ethylene dribromide; EDB		Ethane, 1,2-dibromo-	8011	0.1
	106-93-4		8021	10
			8260	5
Di-n-butyl phthalate	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	8060	5
			8270	10
o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8010	2
			8020	5
			8021	0.5
			8120	10
			8260	5
			8270	10
m-Dichlorobenzene; 1,3-Dichlorobenzene	541-73-1	Benzene, 1,3-Dichloro-	8010	5
			8020	

Common Name[2]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested PQL (µg/L)[6]	Methods[5]
p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	5 2	8010 8020 8021 8120 8260 8270
3,3'-Dichlorobenzidine	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	20	8270
trans-1,4-Dichloro-2-butene	110-57-6	2-Butene, 1,4-dichloro-, (E)-	100	8260
Dichlorodifluoromethane; CFC 12;	75-71-8	Methane, dichlorodifluoro-	0.5 5	8021 8260
1,1-Dichloroethane; Ethyldidene chloride	75-34-3	Ethane, 1,1-dichloro-	1 0.5 5	8010 8021 8260
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,2-dichloro-	0.5 0.3 5	8010 8021 8260
1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	1 0.5 5	8010 8021 8260
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	156-59-2	Ethene, 1,2-dichloro-, (Z)-	0.2 5	8021 8260
trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	156-60-5	Ethene, 1,2-dichloro-, (E)-	1 0.5 5	8010 8021 8260
2,4-Dichlorophenol	120-83-2	Phenol, 2,4-dichloro-	5 10	8040 8270
2,6-Dichlorophenol	87-65-0	Phenol, 2,6-dichloro-	10	8270
1,2-Dichloropropane; Propylene dichloride	78-87-5	Propane, 1,2-dichloro-	0.5 0.05 5	8010 8021 8260
1,3-Dichloropropane; Trimethylene dichloride	142-28-9	Propane, 1,3-dichloro-	0.3 5	8021 8260
2,2-Dichloropropane;	594-20-7	Propane, 2,2-dichloro-		

8021 0.5
Isopropylidene chloride 8260 15
1,1-Dichloropropene .... 563-58-6 1-Propene, 1,1-dichloro- .....
8021 0.2
8260 5
cis-1,3-Dichloropropene 10061-01-5 1-Propene, 1,3-dichloro-, (Z)- .....
8010 20
8260 10
trans-1,3-Dichloro- 1-Propene, 1,3-dichloro-, (E)- 8010
5
propene 10061-02-6 8260
10
Dieldrin ..... 60-57-1 2,7:3,6-Dimethanonaphth[2,3-b]oxirene, ...
8080 0.05
3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a- 8270
10
octahydro-,(1aα,2β,2aα,3β,6β,6aα,7β,7aα)-
Diethyl phthalate ..... 84-66-2 1,2-Benzenedicarboxylic acid, diethyl ester ....
8060 5
8270 10
O,O-Diethyl O-2-pyrazinyl 297-97-2 Phosphorothioic acid, O,O-diethyl O-pyrazinyl
ester..... 8141
5
phosphorothioate; Thionazin 8270
20
Dimethoate ..... 60-51-5 Phosphorodithioic acid, O,O-dimethyl .....
8141 3
S-[2-(methylamino)-2-oxoethyl] ester 8270
20
p-(Dimethylamino)azobenzene 60-11-7 Benzenamine, N,N-dimethyl-4-(phenylazo)- 8270
10
7,12-Dimethylbenz[a]-
anthracene ..... 57-97-6 Benz[a]anthracene, 7,12-dimethyl- .....
8270 10
3,3'-Dimethylbenzidine 119-93-7 [1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl- ...
8270 10
2,4-Dimethylphenol;
m-Xylenol ..... 105-67-9 Phenol, 2,4-dimethyl- .....
8040 5
8270 10
Dimethyl phthalate .... 131-11-3 1,2-Benzenedicarboxylic acid, dimethyl ester ...
8060 5
8270 10
m-Dinitrobenzene ..... 99-65-0 Benzene, 1,3-dinitro- .....
8270 20
4,6-Dinitro-o-cresol .. 534-52-1 Phenol, 2-methyl-4,6-dinitro- .....
8040 150
4,6-Dinitro-2-methylphenol 8270 50
2,4-Dinitrophenol; .... 51-28-5 Phenol, 2,4-dinitro- .....
8040 150
8270 50
2,4-Dinitrotoluene .... 121-14-2 Benzene, 1-methyl-2,4-dinitro- .....
8090 0.2
8270 10
2,6-Dinitrotoluene .... 606-20-2 Benzene, 2-methyl- 1,3-dinitro- .....
8090 0.1
8270 10
Dinoseb; DNBP; ..... 88-85-7 Phenol, 2-(1-methylpropyl)-4,6-dinitro- .....
8150 1
2-sec-Butyl-4,6-dinitrophenol 8270
20
Di-n-octyl phthalate .. 117-84-0 1,2-Benzenedicarboxylic acid, dioctyl ester ....
8060 30
8270 10
Diphenylamine ..... 122-39-4 Benzenamine, N-phenyl- .....
8270 10
Disulfoton ..... 298-04-4 Phosphorodithioic acid, O,O-diethyl .....
8140 2
S-[2-(ethylthio)ethyl] ester 8141
0.5
8270 10

Common Name[2]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested PQL (µg/L)[6]	Methods[5]
Endosulfan I	959-98-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-	0.1	8080
		hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide,	20	8270
Endosulfan II	33213-65-9	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-	0.05	8080
		hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3α,5aα,6β,9β,9aα)-	20	8270
Endosulfan sulfate	1031-07-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-.....	0.5	8080
		hexachloro-1,5,5a,6,9,9a-hexahydro-,3,3-dioxide	10	8270
Endrin	72-20-8	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-	0.1	8080
		hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aα,2β,2aβ,3α,6α,6aβ,7β,7aα)-	20	8270
Endrin aldehyde	7421-93-4	1,2,4-Methenocyclopenta[cd]pentalene-5-carboxaldehyde, ...	0.2	8080
		2,2a,3,3,4,7-hexachlorodecahydro-, (1α,2β,2aβ, 4β,4aβ,5β,6aβ,6bβ,7R*)-	10	8270
Ethylbenzene	100-41-4	Benzene, ethyl-	2	8020
			0.05	8221
			5	8260
Ethyl methacrylate	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester	5	8015
			10	8260
			10	8270
Ethyl methanesulfonate	62-50-0	Methanesulfonic acid, ethyl ester	20	8270
Famphur	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]	20	8270
		phenyl] O,O-dimethyl ester		
Fluoranthene	206-44-0	Fluoranthene	200	8100
			10	8270
Fluorene	86-73-7	9H-Fluorene	200	8100
			10	8270
Heptachlor	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-	0.05	8080
		3a,4,7,7a-tetrahydro-	10	8270
Heptachlor epoxide .... b]oxirene,2,3,4,5,6,7,7-	1024-57-3	2,5-Methano-2H-indeno[1,2-	1	8080
		heptachloro-1a,1b,5,5a,6,6a-hexahydro-, (1aα,1bβ,2α,5α,5aβ,6β,6aα)	10	8270
Hexachlorobenzene	118-74-1	Benzene, hexachloro-	0.5	8120
			10	8270

Common Name[2]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested PQL Methods[5] (µg/L)[6]
Hexachlorobutadiene ...	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	8021 0.5
			8120 5
			8260 10
			8270 10
Hexachlorocyclopentadiene	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro- ...	8120 5
			8270 10
Hexachloroethane	67-72-1	Ethane, hexachloro-	8120 0.5
			8260 10
			8270 10
Hexachloropropene	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-	8270 10
2-Hexanone; Methyl butyl ketone	591-78-6	2-Hexanone	8260 50
Indeno(1,2,3-cd)pyrene	193-39-5	Indeno(1,2,3-cd)pyrene	8100 200
			8270 10
Isobutyl alcohol	78-83-1	1-Propanol, 2-methyl-	8015 50
			8240 100
Isodrin	465-73-6	1,4,5,8-Dimethanonaphthalene,1,2,3,4,10,10-	8270 20
		hexachloro-1,4,4a,5,8,8a hexahydro-	8260 10
		(1α,4α,4aβ,5β,8β,8aβ)-	
Isophorone	78-59-1	2-Cyclohexen-1-one, 3,5,5-trimethyl-	8090 60
			8270 10
Isosafrole	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	8270 10
Kepone	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, ..	8270 20
		1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-	
Lead	(Total)	Lead	6010 400
			7420 1000
			7421 10
Mercury	(Total)	Mercury	7470 2
Methacrylonitrile	126-98-7	2-Propenenitrile, 2-methyl-	8015 5
			8260 100
Methapyrilene	91-80-5	1,2-Ethanediamine, N.N-dimethyl-N[1]-2-pyridinyl-N1/2-	
		thienylmethyl)-	8270 100
Methoxychlor	72-43-5	Benzene,1,1'-(2,2,2,trichloroethylidene)bis[4-methoxy-	8080 2
			8270 10
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8010 20
			8021 10
Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8010 1
			8021 0.3

			8260 10
3-Methylcholanthrene ..	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	8270 10
Methyl ethyl ketone; MEK;	78-93-3	2-Butanone	8015 10
2-Butanone			8260 100
Methyl iodide; Iodomethane	74-88-4	Methane, iodo-	8010 40
			8260 10
Methyl methacrylate ...	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester	8015 2
			8260 30
Methyl methanesulfonate	66-27-3	Methanesulfonic acid, methyl ester	8270 10
2-Methylnaphthalene ...	91-57-6	Naphthalene, 2-methyl-	8270 10
Methyl parathion;		Phosphorothioic acid, O,O-dimethyl	8140 0.5
Parathion methyl	298-00-0	O-(4-nitrophenyl) ester	8141 1
			8270 10
4-Methyl-2-pentanone; .	108-10-1	2-Pentanone, 4-methyl-	8015 5
Methyl isobutyl ketone			8260 100
Methylene bromide; Dibromomethane	74-95-3	Methane, dibromo-	8010 15
			8021 20
			8260 10
Methylene chloride; ...	75-09-2	Methane, dichloro-	8010 5
Dichloromethane			8021 0.2
			8260 10
Naphthalene	91-20-3	Naphthalene	8021 0.5
			8100 200
			8260 5
			8270 10
1,4-Naphthoquinone	130-15-4	1,4-Naphthalenedione	8270 10
1-Naphthylamine	134-32-7	1-Naphthalenamine	8270 10
2-Naphthylamine	91-59-8	2-Naphthalenamine	8270 10
Nickel	(Total)	Nickel	6010 150
			7520 400
o-Nitroaniline; 2-Nitroaniline	88-74-4	Benzenamine, 2-nitro-	8270 50
m-Nitroaniline; 3-Nitroaniline	99-09-2	Benzenamine, 3-nitro-	8270 50
p-Nitroaniline; 4-Nitroaniline	100-01-6	Benzenamine, 4-nitro-	8270 20
Nitrobenzene	98-95-3	Benzene, nitro-	8090 40
			8270 10
o-Nitrophenol;		Phenol, 2-nitro-	8040 5
2-Nitrophenol	88-75-5		8270 10
p-Nitrophenol;		Phenol, 4-nitro-	8040 10
4-Nitrophenol	100-02-7		8270 50
N-Nitrosodi-n-butylamine	924-16-3	1-Butanamine, N-butyl-N-nitroso-	8270 10

Common Name[2]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested PQL Methods[5] (µg/L)[6]
N-Nitrosodiethylamine ..	55-18-5	Ethanamine, N-ethyl-N-nitroso-	8270 20
N-Nitrosodimethylamine .	62-75-9	Methanamine, N-methyl-N-nitroso-	8070 2
N-Nitrosodiphenylamine .	86-30-6	Benzenamine, N-nitroso-N-phenyl-	8070 5
N-Nitrosodipropylamine; N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine	621-64-7	1-Propanamine, N-nitroso-N-propyl-	8070 10
N-Nitrosomethylethylamine	10595-95-6	Ethanamine, N-methyl-N-nitroso-	8270 10
N-Nitrosopiperidine	100-75-4	Piperidine, 1-nitroso-	8270 20
N-Nitrosopyrrolidine ...	930-55-2	Pyrrolidine, 1-nitroso-	8270 40
5-Nitro-o-toluidine	99-55-8	Benzenamine, 2-methyl-5-nitro-	8270 10
Parathion	56-38-2	Phosphorothioic acid, O,O-diethyl	8141 0.5
		O-(4-nitrophenyl) ester	8270 10
Pentachlorobenzene	608-93-5	Benzene, pentachloro-	8270 10
Pentachloronitrobenzene	82-68-8	Benzene, pentachloronitro-	8270 20
Pentachlorophenol	87-86-5	Phenol, pentachloro-	8040 5
			8270 50
Phenacetin	62-44-2	Acetamide, N-(4-ethoxyphenyl)	8270 20
Phenanthrene	85-01-8	Phenanthrene	8100 200
			8270 10
Phenol	108-95-2	Phenol	8040 1
			8270 10
p-Phenylenediamine	106-50-3	1,4-Benzenediamine	8270 10
Phorate	298-02-2	Phosphorodithioic acid, O,O-diethyl	8140 2
		S-[(ethylthio)methyl] ester	8141 0.5
			8270 10
Polychlorinated biphenyls; PCBs; ..... Aroclors	See Note 9	1,1'-Biphenyl, chloro derivatives	8080 50 8270 200
Pronamide	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl -2-propynyl)-	8270 10
Propionitrile; Ethyl cyanide	107-12-0	Propanenitrile	8015 60
			8260 150
Pyrene	129-00-0	Pyrene	8100 200
			8270 10
Safrole	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-	8270 10

Selenium	(Total)	Selenium	
6010	750		
		7740	20
		7741	20
Silver	(Total)	Silver	
6010	70		
		7760	100
		7761	10
Silvex; 2,4,5-TP	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	
8150	2		
Styrene	100-42-5	Benzene, ethenyl-	
8020	1		
		8021	0.1
		8260	10
Sulfide	18496-25-8	Sulfide	
9030	4000		
2,4,5-T;	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-	
8150	2		
2,4,5-Trichlorophenoxyacetic acid			
1,2,4,5-Tetrachlorobenzene	95-94-3	Benzene, 1,2,4,5-tetrachloro-	8270
10			
1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8010
5			
		8021	0.05
		8260	5
1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8010
0.5			
		8021	0.1
		8260	5
Tetrachloroethylene;		Ethene, tetrachloro-	8010
0.5			
Tetrachloroethane; ...	127-18-4		8021
0.5			
chloroethene; Perchloroethylene			8260
5			
2,3,4,6-Tetrachlorophenol	58-90-2	Phenol, 2,3,4,6-tetrachloro-	8270
10			
Thallium	(Total)	Thallium	
6010	400		
		7840	1000
		7841	10
Tin	(Total)	Tin	
6010	40		
Toluene	108-88-3	Benzene, methyl-	
8020	2		
		8021	0.1
		8260	5
o-Toluidine	95-53-4	Benzenamine, 2-methyl-	
8270	10		
Toxaphene	See Note 10	Toxaphene	
8080	2		

Common Name[2]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL (µg/L)[6]
1,2,4-Trichlorobenzene .	120-82-1	Benzene, 1,2,4-trichloro-		
8021	0.3			
			8120	0.5
			8260	10
			8270	10
1,1,1-Trichloroethane;	71-55-6	Ethane, 1,1,1-trichloro-		
8010	0.3			
Methylchloroform			8021	0.3

			8260 5
1,1,2-Trichloroethane .. 8010 0.2	79-00-5	Ethane, 1,1,2-trichloro-	
			8260 5
Trichloroethylene; 1		Ethene, trichloro-	8010
Trichloroethene..... 0.2	79-01-6		8021
			8260 5
Trichlorofluoromethane; 8010 10		Methane, trichlorofluoro-	
CFC-11 ..... 0.3	75-69-4		8021
			8260 5
2,4,5-Trichlorophenol .. 8270 10	95-95-4	Phenol, 2,4,5-trichloro-	
2,4,6-Trichlorophenol .. 8040 5	88-06-2	Phenol, 2,4,6-trichloro-	
			8270 10
1,2,3-Trichloropropane . 8010 10	96-18-4	Propane, 1,2,3-trichloro-	
			8021 5
			8260 15
0,0,0-Triethyl phosphoro-thioate 8270 10	126-68-1	Phosphorothioic acid, 0,0,0-triethylester	
sym-Trinitrobenzene 8270 10	99-35-4	Benzene, 1,3,5-trinitro-	
Vanadium 6010 80	(Total)	Vanadium	
			7910 2000
			7911 40
Vinyl acetate 8260 50	108-05-4	Acetic acid, ethenyl ester	
Vinyl chloride; 8010 2		Ethene, chloro-	
Chloroethene 0.4	75-01-4		8021
			8260 10
Xylene (total) 8020 5	See Note 11	Benzene, dimethyl-	
			8021 0.2
			8260 5
Zinc 6010 20	(Total)	Zinc	
			7950 50
			7951 0.5

Notes

1. The regulatory requirements pertain only to the list of substances; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.
2. Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.
3. Chemical Abstracts Service registry number. Where "Total" is entered, all species in the ground water that contain this element are included.
4. CAS index are those used in the 9th Collective Index.
5. Suggested Methods refer to analytical procedure numbers used in EPA Report SW-846 "Test Methods for Evaluating Solid Waste", third edition, November 1986, as revised, December 1987. Analytical details can be found in SW-846 and in documentation on file at the agency. CAUTION: The methods listed are representative SW-846 procedures and may not always be the most suitable method(s) for monitoring an analyte under the regulations.
6. Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in ground waters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. PQLs are based on 5 mL samples for volatile organics and 1 L samples for semivolatile organics. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.

7. This substance is often called Bis(2-chloroisopropyl) ether, the name Chemical Abstracts Service applies to its noncommercial isomer, Propane, 2,2'-oxybis[2-chloro- (CAS RN 39638-32-9).
8. Chlordane: This entry includes alpha-chlordane (CAS RN 5103-71-9), beta-chlordane (CAS RN 5103-74-2), gamma-chlordane (CAS RN 5566-34-7), and constituents of chlordane (CAS RN 57-74-9 and CAS RN 12789-03-6). PQL shown is for technical chlordane. PQLs of specific isomers are about 20 µg/L

by method 8270.
9. Polychlorinated biphenyls (CAS RN 1336-36-3); this category contains congener chemicals, including constituents of Aroclor 1016 (CAS RN 12674-11-2), Aroclor 1221 (CAS RN 11104-28-2), Aroclor 1232 (CAS RN 11141-16-5), Aroclor 1242 (CAS RN 53469-21-9), Aroclor 1248 (CAS RN 12672-29-6), Aroclor 1254 (CAS RN 11097-69-1), and Aroclor 1260 (CAS RN 11096-82-5). The PQL shown is an average value for PCB congeners.
10. Toxaphene: This entry includes congener chemicals contained in technical toxaphene (CAS RN 8001-35-2), i.e., chlorinated camphene.
11. Xylene (total): This entry includes o-xylene (CAS RN 96-47-6), m-xylene (CAS RN 108-38-3), p-xylene (CAS RN 106-42-3), and unspecified xylenes (dimethylbenzenes) (CAS RN 1330-20-7). PQLs for method 8021 are 0.2 for o-xylene and 0.1 for m- or p-xylene. The PQL for m-xylene is 2.0 µg/L by method 8020 or 8260.

(History: 75-10-204, MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; AMD, 1993 MAR p. 2784, Eff. 11/25/93; TRANS, from DHES, 1995 MAR p. 2253; AMD, 1997 MAR p. 1031, Eff. 6/24/97.)

17.50.709 REPORTING AND PLANNING REQUIREMENTS (1) In addition to the other reports indicated above, each facility is required to prepare the following plans and reports:

(a) an annual report describing in full all ground water sampling, water level measurements, modifications to the monitoring well network, inspections, maintenance activity and construction or operational events at the facility that may affect the monitoring well network;

(b) a ground water monitoring plan indicating:

(i) the ground water monitoring wells designated by the owner or operator and the department as wells included in the ground water monitoring network for active and closed portions of the facility;

(ii) the approximate dates of sampling for each of the ground water monitoring wells; and

(iii) periodic updates and revisions to the ground water monitoring plan to ensure monitoring of new active and closed portions of the facility. An owner or operator must update the ground water monitoring plan at least once each 5 years, except for closed facilities whose plans must be updated at least every 10 years.

(2) If no major plan or report is being prepared at the time of new well construction, development, or rehabilitation, then all required documentation of this work must be submitted to the department within 90 days of the start of work on the well. Otherwise the well construction and development details will be attached as an appendix to the major plan or report.

(3) The department may require the facility owner or operator to prepare other reports or plans if those reports and plans are determined by the department to be necessary to protect public health or natural resources.

(4) A copy of all plans, reports, studies and other ground water monitoring methods or activities must be supplied to the department and placed in the operating record.

(5) Revisions, changes, and additional requirements of the department must be incorporated into the operating records at a facility. (History: 75-10-204, MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.710 DEFINITION OF EXTENT OF CONTAMINATION

(1)(a) If ground water concentration(s) in samples from any facility ground water monitoring well(s) for any Table 1 [ARM 17.50.708] constituent equal or exceed an enforcement standard or show a significant statistical increase above background levels or a statistically significant decrease in pH occurs, the owner or operator must:

(i) Notify the department in writing within 14 days of the discovery. The notification must specify the parameters and the well(s) involved;

(ii) Begin a program of assessment monitoring and resample all of the ground water monitoring wells for constituents of Table 2 [ARM 17.50.708] within 90 days;

(iii) Collect and analyze a minimum of at least 1 sample from each downgradient well during each sampling event consistent with the methods in the facility's sample and analysis plan approved under ARM 17.50.708;

(iv) For any constituent detected in the downgradient wells as a result of the complete Table 2 analysis, collect and analyze a minimum of 4 independent samples from each well (downgradient and upgradient) to establish background for the constituents detected;

(v) Continue assessment monitoring until the conditions specified in (2) of this rule are satisfied. During continued assessment monitoring the owner or operator must:

(A) Sample all wells for all Table 2 constituents at least annually;

(B) Sample all wells within 90 days and at least semi-annually thereafter for all Table 1 constituents and all Table 2 constituents detected in the initial, or subsequent annual, Table 2 sampling;

(C) Collect and analyze at least 1 sample from each well (background and downgradient) during each sampling event; and

(D) For any constituent detected in the downgradient wells as a result of the Table 2 analysis, collect and analyze a minimum of 4 independent samples from each well (downgradient and upgradient) to establish background for the constituents detected.

(b) The department may delete any of the Table 2 constituents required under assessment monitoring if it can be demonstrated that the removed constituents are not reasonably expected to be in or derived from the waste contained in the unit.

(c) The department may designate an appropriate alternate

subset of wells to be sampled for Table 2 constituents during continued assessment monitoring.

(d) The department may specify an alternative sampling frequency for the full set of Table 2 constituents, or the Table 1 constituents and Table 2 constituents detected during the full Table 2 analysis. The frequency must be no less than

annual and must be based on:

(i) the lithology of the aquifer and unsaturated zone;

(ii) the hydraulic conductivity of the aquifer and unsaturated zone;

(iii) ground water flow rates;

(iv) the minimum distance between upgradient edge of the disposal unit and downgradient monitoring well screen (minimum distance of travel);

(v) the resource value of the aquifer; and

(vi) the nature (fate and transport) of any constituents detected in response to this section.

(e) The department may require the owner or operator to sample public or private water supply wells or springs and to determine water level elevations in such wells to determine the extent of ground water contamination.

(f) The relevant point of compliance (POC) to determine if an enforcement standard or preventive action limit has been attained or exceeded is specified as no more than 150 meters beyond the waste management unit boundary and must be located on land owned by the owner of the disposal unit.

(i) The downgradient monitoring system must be installed at the POC specified by the department that ensures detection of ground water contamination in the uppermost aquifer.

(ii) When physical obstacles preclude installation of ground water monitoring wells at the relevant point of compliance at existing units, the downgradient monitoring system may be installed at the closest practicable distance hydraulically downgradient from the POC specified by the department that ensures detection of ground water contamination in the uppermost aquifer.

(g) The department may approve a multi-unit ground water monitoring system instead of separate ground water monitoring systems for each disposal unit when the facility has several units, provided the multi-unit ground water monitoring system meets the requirement of ARM 17.50.706, and the department determines it is equally or more protective of human health and the environment as individual monitoring systems for each unit. An owner or operator of a facility may submit a written request for approval of a multi-unit ground water monitoring system. The requirements shall include an evaluation of at least the following factors:

(i) the hydrogeologic characteristics of the facility and surrounding land;

(ii) the climatic factors of the area;

(iii) the volume and physical characteristics of the leachate;
(iv) proximity of ground water users;
(v) the age, and design of the site;
(vi) the classification and quality of ground water;
(vii) the types of waste accepted at the disposal units;

and
(viii) the number, spacing, and orientation of the disposal units.
(h) The owner or operator must place in the operating record and submit to the department the results of any sampling required under this rule within 14 days of the receipt of results by the owner or operator.
(i) The owner or operator must notify the department of any detection of any Table 2 [ARM 17.50.708] constituents within 14 days of the receipt of results by the owner or operator. A copy of the notice must be placed in the operating record.
(j) The owner or operator may demonstrate that a source other than a disposal unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in ground water quality. A report documenting this demonstration must be certified by a qualified ground water scientist and approved by the department and placed in the operating record. If a successful demonstration is made the owner or operator must continue monitoring in accordance with the detection monitoring program pursuant to ARM 17.50.708. If a successful demonstration is not made within 90 days, the owner or operator must comply with this rule and initiate assessment monitoring.
(2) If the concentrations of all Table 2 [ARM 17.50.708] constituents are shown to be at or below background values, using the statistical procedures in ARM 17.50.708, for 2 consecutive semi-annual sampling events, the owner or operator must notify the department of this finding and may return to detection monitoring for Table 1 [ARM 17.50.708] constituents.
(3) If the concentrations of any Table 2 [ARM 17.50.708] constituents are above background values, but all concentrations are below the ground water protection standard established under the Montana ground water quality standards, using the statistical procedures in ARM 17.50.708, the owner or operator must continue assessment monitoring on at least a semi-annual basis for all Table 1 [ARM 17.50.708] constituents and all Table 2 constituents detected in the initial assessment monitoring.
(4) If 1 or more Table 2 [ARM 17.50.708] constituents are detected at statistically significant levels above the ground water protection standard established under (5) of this rule in any sampling event, the owner or operator must, within 14 days of this finding, place a notice in the operating record identifying the Table 2 constituents that have exceeded the

ground water protection standard and notify the department and all appropriate local government officials. The owner or operator also:

(a)(i) Must characterize the nature and extent of the

release by installing additional monitoring wells as necessary;

(ii) Must install at least 1 additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well for all Table 2 constituents;

(iii) Must notify all persons who own the land or reside on the land that directly overlies any part of the plume of contamination if contaminants have migrated off-site if indicated by sampling of wells; and

(iv) Must initiate an assessment of corrective measures within 90 days; or

(b) May demonstrate that a source other than a disposal unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in ground water quality. A report documenting this demonstration must be certified by a qualified ground water scientist and approved by the department and placed in the operating record. If a successful demonstration is made the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this rule, and may return to detection monitoring if the Table 2 [ARM 17.50.708] constituents are at or below background as specified in (2) of this rule. Until a successful demonstration is made, the owner or operator must comply with (4) of this rule, including initiating an assessment of corrective measures.

(5) The ground water protection standard (enforcement standard) for each Table 1 and Table 2 [ARM 17.50.708] constituent must be:

(a) For constituents for which a maximum contaminant level (MCL) has been promulgated under the Montana ground water quality standards, the MCL for that constituent;

(b) For constituents for which MCLs have not been promulgated, the background concentration for the constituent established from wells in accordance with ARM 17.50.708;

(c) For constituents for which the background level is higher than the MCL identified under (a) above or health based levels identified under (d) below, the background concentration; or

(d) The department may establish alternative ground water protection standards (enforcement standards) for which MCLs have not been established based on the following criteria:

(i) The level is derived in a manner consistent with US EPA guidelines for assessing the health risks of environmental pollutants (51 FR 33992, 34006, 34014, 34028, September 24,

1986);

(ii) The level is based on scientifically valid studies conducted in accordance with the Toxic Substances Control Act Good Laboratory Practice Standards (40 CFR, Part 792) or equivalent;

(iii) For carcinogens, the level represents a

concentration associated with an excess lifetime cancer risk level (due to continuous lifetime exposure) with the 1×10^{-4} to 1×10^{-6} range; and

(iv) For systemic toxicants, the level represents a concentration to which the human population could be exposed to on a daily basis that is likely to be without appreciable risk of deleterious effects during a lifetime. For purposes of this subsection, systemic toxicants include toxic chemicals that cause effects other than cancer or mutation.

(6)(a) Within 90 days of finding that any of the constituents listed in Table 2 [ARM 17.50.708] have been detected at a statistically significant level exceeding the ground water protection standards defined under (5) of this rule, the owner or operator must initiate an assessment of corrective measures. Such an assessment must be completed within a reasonable period of time, not to exceed an additional 60 days, and be submitted to the department.

(b) The owner or operator must continue to monitor in accordance with the assessment monitoring program as specified in this rule.

(c) The assessment shall include an analysis of the effectiveness of potential corrective measures in meeting all of the requirements and objectives of the remedy as described under (7) of this rule, addressing at least the following:

(i) The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;

(ii) The time required to begin and complete the remedy;

(iii) The costs of remedy implementation; and

(iv) The institutional requirements such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy(ies).

(d) The owner or operator must discuss the results of the corrective measures assessment, prior to the selection of remedy, in a public meeting with interested and affected parties.

(7)(a) Based on the results of the corrective measures assessment conducted under (6) of this rule, the owner or operator must select a remedy that, at a minimum, meets the standards listed in (b) below. The owner or operator must notify the department, within 14 days of selecting a remedy, that a report has been placed in the operating record describing

the selected remedy and how it meets the standards in (b) below.

(b) Remedies must:

(i) Be protective of human health and the environment;

(ii) Attain the ground water protection standard as specified pursuant to (5) of this rule;

(iii) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent practicable, further releases of Table 2 [ARM 17.50.708] constituents into the environment that may pose a threat to human health or the environment; and

(iv) Comply with standards for management of wastes as specified in (8) of this rule.

(v) Be approved by the department.

(c) In selecting a remedy that meets the standards of (7)(b) of this rule, the owner or operator shall consider the following evaluation factors:

(i) The long and short-term effectiveness and protectiveness of the potential remedy(ies), along with the degree of certainty that the remedy will prove successful based on consideration of the following:

(A) Magnitude of reduction of existing risks;

(B) Magnitude of residual risks in terms of likelihood of further releases due to waste remaining following implementation of a remedy;

(C) The type and degree of long-term management required, including monitoring, operation, and maintenance;

(D) Short-term risks that might be posed to the community, workers, or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and redisposal or containment;

(E) Time until full protection is achieved;

(F) Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, redisposal, or containment;

(G) Long-term reliability of the engineering and institutional controls; and

(H) Potential need for replacement of the remedy.

(ii) The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the following factors:

(A) The extent to which containment practices will reduce further releases;

(B) The extent to which treatment technologies may be used.

(iii) The ease or difficulty of implementing a potential remedy(ies) based on consideration of the following types of factors:

(A) degree of difficulty associated with constructing the

technology;

(B) expected operational reliability of the technologies;

(C) need to coordinate with and obtain necessary approvals and permits from other agencies;

(D) availability of necessary equipment and specialists;

and

(E) available capacity and location of needed treatment, storage, and disposal services.

(iv) Practicable capability of the owner or operator, including a consideration of the technical and economic capability.

(v) The degree to which community concerns are addressed by a potential remedy(ies).

(d) The owner or operator shall specify as part of the selected remedy a schedule for initiating and completing remedial activities. Such a schedule must require the initiation of remedial activities within a reasonable period of time taking into consideration the factors set forth in (i)-(viii) below. The owner or operator must consider the following factors in determining the schedule of remedial activities:

(i) Extent and nature of contamination;

(ii) Practical capabilities of remedial technologies in achieving compliance with ground water protection standards established under (5) of this rule and other objectives of the remedy;

(iii) Availability of treatment or disposal capacity for wastes managed during implementation of the remedy;

(iv) Desirability of utilizing technologies that are not currently available, but which may offer significant advantages over already available technologies in terms of effectiveness, reliability, safety, or ability to achieve remedial objectives;

(v) Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy;

(vi) Resource value of the aquifer including:

(A) current and future uses;

(B) proximity and withdrawal rate of users;

(C) ground water quantity and quality;

(D) the potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituent;

(E) the hydrogeologic characteristic of the facility and surrounding land;

(F) ground water removal and treatment costs; and

(G) the cost and availability of alternative water supplies.

(vii) Practicable capability of the owner or operator; and

(viii) Other relevant factors.

(e) The department may determine that remediation of a release of Table 2 [ARM 17.50.708] constituent from a disposal

unit is not necessary if the owner or operator demonstrates to the department that:

(i) The ground water is additionally contaminated by substances that have originated from a source other than a

disposal unit and those substances are present in concentrations such that cleanup of the release from the disposal unit would provide no significant reduction in risk to actual or potential receptors; or

(ii) The constituent(s) is present in ground water that:

(A) Is not currently or reasonably expected to be a source of drinking water; and

(B) Is not hydraulically connected with waters to which the hazardous constituents are migrating or are likely to migrate in a concentration(s) that would exceed the ground water protection standards established under (5) of this rule; or

(iii) Remediation of the release(s) is technically impracticable; or

(iv) Remediation results in unacceptable cross-media impacts.

(f) A determination by the department pursuant to (7)(e) of this rule will not affect the authority of the state to require the owner or operator to undertake source control measures or other measures that may be necessary to eliminate or minimize further releases to the ground water, to prevent exposure to the ground water, or to remediate the ground water to concentrations that are technically practicable and significantly reduce threats to human health or the environment.

(8)(a) Based on the schedule established under (7)(d) of this rule for initiation and completion of remedial activities, the owner/operator must:

(i) Establish and implement a corrective action ground water monitoring program that:

(A) at a minimum, meets the requirements of an assessment monitoring program under this rule;

(B) indicates the effectiveness of the corrective action remedy; and

(C) demonstrates compliance with ground water protection standard pursuant to (5) of this rule.

(ii) Implement the corrective action remedy selected under (7) of this rule; and

(iii) Take any interim measures necessary to ensure the protection of human health and the environment. Interim measures should, to the greatest extent practicable, be consistent with the objectives of and contribute to the performance of any remedy that may be required pursuant to (7) of this rule. The following factors must be considered by an owner or operator in determining whether interim measures are necessary:

(A) time required to develop and implement a final remedy;
(B) actual or potential exposure of nearby populations or environmental receptors to hazardous constituents;

(C) actual or potential contamination of drinking water supplies or sensitive ecosystems;
(D) further degradation of the ground water that may occur if remedial action is not initiated expeditiously;
(E) weather conditions that may cause hazardous constituents to migrate or be released;
(F) risks of fire or explosion, or potential for exposure to hazardous constituents as a result of an accident or failure of a container or handling system; and
(G) other situations that may pose threats to human health and the environment.
(b) An owner or operator may determine, based on information developed after implementation of the remedy has begun or other information, that compliance with the requirements of (7)(b) of this rule are not being achieved through the remedy selected. In such cases, the owner or operator must implement other methods or techniques that could practicably achieve compliance with the requirements, unless the owner or operator makes the determination specified in (8)(c) of this rule.
(c) If the owner or operator determines that compliance with the requirements of (7)(b) of this rule cannot be practically achieved with any currently available methods, the owner or operator must:
(i) Obtain certification of a qualified ground water scientist and approval by the department that compliance with requirements under (7)(b) of this rule cannot be practically achieved with any currently available methods;
(ii) Implement alternate measures to control exposure of humans or the environment to residual contamination, as necessary to protect human health and the environment; and
(iii) Implement alternate measures for control of the sources of contamination, or for removal or decontamination of equipment, units, devices, or structures that are:
(A) Technically practicable; and
(B) Consistent with the overall objective of the remedy.
(iv) Submit to the department for approval a report justifying the alternative measures 14 days prior to implementing the alternative measures and place a copy of the report in the operating record.
(d) All solid wastes that are managed pursuant to a remedy required under (7) of this rule, or an interim measure required under (8)(a)(iii) of this rule, must be managed in a manner:
(i) That is protective of human health and the

environment; and

(ii) That complies with applicable federal Resource Conservation and Recovery Act requirements.

(e) Remedies selected pursuant to (7) of this rule must be considered complete when:

(i) The owner or operator complies with the ground water protection standards established under (5) of this rule at all points within the plume of contamination that lie beyond the ground water monitoring well system established under ARM 17.50.706.

(ii) Compliance with the ground water protection standards established under (5) of this rule has been achieved by demonstrating that concentrations of Table 2 [ARM 17.50.708] constituents have not exceeded the ground water protection standard(s) for a period of three consecutive years using the statistical procedures and performance standards in ARM 17.50.708(12) and (13). The department may specify an alternative length of time during which the owner or operator must demonstrate that concentrations of Table 2 [ARM 17.50.708] constituents have not exceeded the ground water protection standard(s), taking into consideration:

(A) extent and concentration of the release(s);

(B) behavior characteristics of the hazardous constituents in the ground water;

(C) accuracy of monitoring or modeling techniques, including any seasonal, meteorological, or other environmental variabilities that may affect the accuracy; and

(D) characteristics of the ground water.

(iii) All actions required to complete the remedy have been satisfied.

(f) Upon completion of the remedy, the owner or operator must supply the department within 14 days with a certification that the remedy has been completed in compliance with the requirements of (e) above and a copy must be placed in the operating record. The certification must be signed by the owner or operator and by a qualified ground water scientist and approved by the department.

(g) When, upon completion of the certification, the owner or operator determines that the corrective action remedy has been completed in accordance with the requirements under (e) above, the owner or operator will be released from the requirements for financial assurance for corrective action under ARM 17.50.540.

(9)(a) The department hereby adopts and incorporates by reference:

(i) 51 FR 33992, 34006, 34014, and 34028 (September 24, 1986), containing EPA guidelines for assessing the health risks of environmental pollutants; and

(ii) 40 CFR, Part 792, setting standards ensuring

scientifically valid laboratory studies.

(b) Copies of the above may be obtained from the Department of Environmental Quality, PO Box 200901, Helena, MT 59620-0901 [(406)444-1430]. (History: 75-10-204, MCA; IMP, 75-10-204, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; AMD, 1993 MAR p.

2784, Eff. 11/25/93; TRANS, from DHES, 1995 MAR p. 2253.)

Rules 17.50.711 through 17.50.714 reserved

17.50.715 PHASED LANDFILL CONSTRUCTION (1) The 5 year updates to the ground water monitoring report specified under ARM 17.50.710, shall describe the relationship between the facility ground water monitoring system and currently closed and active units. (History: 75-10-204(5), MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.716 LATERAL LANDFILL EXPANSION (1) Lateral landfill expansions outside the current area licensed to receive solid waste will be considered by the department as equivalent to licensing a new facility under 75-10-221, MCA. Lateral landfill expansion outside the current area licensed to receive solid waste will not be allowed by the department until the required studies and plans are approved by the department and a license to operate a solid waste management system is issued by the department. (History: 75-10-204, MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

Rules 17.50.717 through 17.50.719 reserved

17.50.720 MONITORING DURING CLOSURE (1) The ground water monitoring plan must include a discussion of the anticipated ground water monitoring system and schedule of sampling for closed portions of the facility.

(2) If a facility specified in 75-10-207(1), MCA, undergoes closure prior to January 1, 1993, the department will require a minimum of 6 semi-annual sampling episodes for Table 1 [ARM 17.50.708] parameters prior to approving final closure. These sampling events must occur after the last date the facility received waste. If no exceedence of preventative action limits or enforcement standards occurs for any Table 1 [ARM 17.50.708] constituent, then ground water monitoring at the closed landfill may be discontinued contingent upon written approval obtained from the department. Depending on the site-specific hydrogeology study, the department reserves the right to increase or decrease the number of ground water sampling events required during closure approval. (History: 75-10-204, MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.721 POST-CLOSURE MONITORING (1) Any facility that detects Table 1 [ARM 17.50.708] constituents of a hazardous substance in ground water at concentrations above background at the facility will be required to conduct post-closure ground water monitoring.

(2) Any facility designated by 75-10-207, MCA, that closes on or after January 1, 1993, is required to monitor ground water for at least 30 years following closure. The post-closure monitoring schedule will be determined by the department. (History: 75-10-204(5), MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.722 MONITORING WELL ABANDONMENT (1) Abandoned borings, water supply wells and monitoring wells shall be completely sealed with grout or bentonite in order to prevent future contamination of ground water. The sealing materials used shall be continuous, physically and chemically stable, and have a hydraulic conductivity of less than 1×10^{-5} cm/sec.

(2) All boreholes not completed as a monitoring well, piezometer, or water supply well must be abandoned immediately after drilling and completion of soil testing.

(3) If any borehole is deeper than the well to be placed in it, the portions of the borehole below the well screen shall

be sealed with bentonite pellets or a bentonite slurry.

(4) All abandonment activities must be carried out in compliance with ARM 36.21.670 through 36.21.678 and ARM 36.21.810. (History: 75-10-204, MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645,

Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.723 NO-MIGRATION DEMONSTRATION (1) Ground water monitoring at a facility may be waived by the department if the facility owner or operator can demonstrate there is no potential for hazardous constituents to contaminate the uppermost aquifer.

(2) No-migration petitions must be accompanied by facility specific data and studies and must be certified by a qualified ground water scientist. No-migration demonstrations must be based on:

(a) Site-specific field collected measurements, sampling, and analysis of physical, chemical, and biological processes affecting contaminant fate and transport; and

(b) Contaminant fate and transport predictions that maximize contaminant migration and consider impacts on human health and environment.

(3) No-migration petitions must demonstrate that ground water will not become contaminated for at least 30 years after the entire facility is closed.

(4) The department may deny any no-migration petition or variance if the department determines that insufficient data and studies exist to demonstrate no potential for migration of contaminants or leachate at a facility.

(5) The department may require the installation of vadose zone monitoring devices, piezometers or saturated zone monitor wells as part of a ongoing no-migration demonstration. (History: 75-10-204, MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.724 MONITORING WELL NETWORK MAINTENANCE (1) The ground water monitoring report must include a maintenance plan for all monitoring wells in the ground water monitoring well network for active and closed portions of the facility.

(2) The facility owner or operator shall inspect all monitoring wells at least twice each year. Sampling personnel shall inspect all monitoring wells each time the well is sampled or a static water level is measured. If, for any reason, a monitoring well is destroyed or otherwise fails to function properly, the facility operator shall notify the department in writing within 10 days after discovery. The well shall be repaired if possible. If the well cannot be repaired, it shall be properly abandoned and replaced within 90 days unless otherwise approved in writing by the department.

(3) Maintenance activities shall continue for the active life and post-closure care period of the facility. If monitoring is to be discontinued at any or all wells, proper abandonment procedures must be followed. (History: 75-10-204, MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91;

AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.725 DEPARTMENT APPROVAL REQUIRED (1) All plans, reports, studies and other ground water monitoring methods or activities are subject to review, modification, and approval by the department.

(2) Revisions, changes, and additional requirements of the department must be incorporated into the ground water monitoring system at a facility.

(3) The department shall determine, and establish through rulemaking, preventative action limits and enforcement standards for indicator parameters listed in Table 1 [ARM 17.50.708]. (History: 75-10-204(5), MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; TRANS, from DHES, 1995 MAR p. 2253.)

17.50.726 INSPECTIONS (1) The department may, pursuant to 75-10-205, MCA, conduct inspections of ground water monitoring systems at reasonable hours upon presentation of appropriate credentials.

(2) The department may request duplicate samples for independent analysis or to conduct independent sampling at facilities. (History: 75-10-204, MCA; IMP, 75-10-207, MCA; NEW, 1991 MAR p. 1937, Eff. 10/18/91; AMD, 1993 MAR p. 1645, Eff. 10/9/93; TRANS, from DHES, 1995 MAR p. 2253.)